



United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
333 Bush Street, Suite 515
San Francisco, CA 94104

IN REPLY REFER TO:
(ER 16/0226)

Filed Electronically

24 June 2016

Secretary Kimberly D. Bose
Federal Energy Regulatory Commission
888 1st Street, N.E.
Washington, D.C. 20426-0001

Subject: Review of Notice of Application Ready for Environmental Analysis and Soliciting Comments, Recommendations, Terms and Conditions and Prescriptions; Lassen Lodge Hydroelectric Project (Major Original License) FERC No. 12496-002; Tehama County, California

Dear Secretary Bose,

The Department of the Interior has received and reviewed the subject document and has the following comments to offer:

The proposed Lassen Lodge Hydroelectric Project (Project) is located on the South Fork of Battle Creek. A portion of the the Battle Creek Salmon and Steelhead Restoration Project (Restoration Project) is also located on the South Fork of Battle Creek.

Under the Restoration Project, the Bureau of Reclamation, has partnered with the U.S. Fish and Wildlife Service, Pacific Gas and Electric Company, National Marine Fisheries Service and the California Department of Fish and Wildlife to restore 42 miles of habitat in Battle Creek and an additional six miles of habitat in tributaries to Battle Creek for threatened and endangered salmon and steelhead.

The Restoration Project is primarily being accomplished by modifying the Battle Creek Hydroelectric Project (P-1121). The Bureau of Reclamation supports Federal and State Resource Agencies' environmental analyses to ensure that the proposed Project does not detrimentally impact the Restoration Project.

The U.S. Fish and Wildlife Service (USFWS), has reviewed the Federal Energy Regulatory Commission's (Commission or FERC) April 25, 2016, "*Notice of Application Ready for Environmental Analysis and Soliciting Comments, Recommendations, Preliminary Terms and Conditions, and Prescriptions*" (REA Notice) for Rugraw LLC's (Applicant) Lassen Lodge Hydroelectric Project (FERC Project No. 12496-002)(Project).

The following preliminary Section 18 Prescriptions for Fishways, recommended Section 10(j) Conditions, and comments are provided in response to the Commission's April 25, 2016, REA Notice regarding the Project in accordance with the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531, *et seq.*), the Federal Power Act (FPA), as amended (16 U.S.C. § 791a, *et seq.*); the Fish and Wildlife Coordination Act (FWCA), as amended (16 U.S.C. § 661, *et seq.*); the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703-712); the Bald and Golden Eagle Protection Act (BGEPA) of 1940, as amended (16 U.S.C. § 668-668d); the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. §4321 *et seq.*); and the Central Valley Project Improvement Act (CVPIA) (Pub. L. No. 102-575, 106 Stat. 4600, 4706, Title 34 (1992)).

The Department of the Interior (Department) filed an Intervention Notice, on behalf of its Bureaus, in the proceeding for this Project with the Commission on October 22, 2014.

The USFWS does not support the issuance of an original license for the Project, because it would impact trust resources that the USFWS has gone to great effort to restore. The Service continues to have unresolved concerns regarding the Project, because it could compromise restoration efforts of the Battle Creek Salmon and Steelhead Restoration Project (BCSSRP) in South Fork Battle Creek. The USFWS is actively involved in the BCSSRP, with financial and regulatory interest in restoring and recovering Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead trout (*O. mykiss*) populations in South Fork Battle Creek.

ESA section 7 consultation between the Commission and USFWS has not been conducted on this Project. By this letter, the USFWS requests that the Commission enter into section 7 consultation pursuant to 50 CFR 402.14 to address Project effects to the California red-legged frog (*Rana draytonii*), vernal pool fairy shrimp (*Branchinecta lynchi*), and Slender Orcutt Grass (*Orcuttia tenuis*). The bald eagle (*Haliaeetus leucocephalus*) is no longer listed under the ESA; however, powerline effects to bald eagles should be addressed through consultation and permitting under the BGEPA.

At this time, several ESA issues remain to be addressed through the Commission's compliance with Section 7 of the ESA. The USFWS has an expectation that, should a license be issued, the Commission will incorporate as license articles in the new license the USFWS's Section 18 Prescriptions for Fishways, recommended Section 10(j) Conditions, Section 10(a) Recommendations, and comments (our FPA Terms), and the Commission will successfully meet its responsibilities under the ESA.

PROJECT DESCRIPTION

The Lassen Lodge Project would consist of: (1) an 8-foot-high and 63-foot-long diversion dam; (2) an impoundment of approximately 0.5 acre; (3) a 17-foot by 25-foot enclosed concrete intake structure with two 5-foot by 12-foot trash racks; (4) a 20-foot by 59-foot control/fish screen structure located contiguous with the concrete intake structure; (5) a 7,565-foot-long, 48-inch diameter low-pressure pipeline connected to a 5,230-foot-long penstock with a net head of 791 feet (total pipeline length is 12,795 feet); (6) a 50-foot by 50-foot powerhouse containing one generating unit with a 5,000-kilowatt capacity; (7) a 50-foot by 50-foot substation area; (8) a 40-foot by 35-foot switchyard; (9) a 100-foot by 100-foot multipurpose area; and (10) a new 12-mile-long, 60-kilovolt transmission line.

The Project is estimated to produce approximately 25,000,000 kilowatt hours annually.

The Project diversion would be located on the South Fork of Battle Creek in Tehama County, California approximately 1.5 miles west of the small community of Mineral situated on State Highway 36 east of Red Bluff, California. From the Battle Creek confluence with the Sacramento River the diversion would be located at River Mile 23. The Project bypassed reach would extend approximately 2.4 miles downstream to just upstream of Panther Grade where the powerhouse tailrace would direct flow back into South Fork Battle Creek.

Panther Grade is a stream feature composed of a boulder cascade, complex chutes, and four falls, but the USFWS considers this feature passable to upstream migration of anadromous salmonids in most years and downstream migration in all years. Angel Falls is located about 0.7 miles downstream of the Project diversion and is an undisputed barrier to salmon migration.

Currently, the Pacific Gas and Electric Company's (PG&E) Battle Creek Hydroelectric Project (P-1121), with facilities on the main stem and on the North and South Forks of Battle Creek, is undergoing a multi-decade long, \$150-million dollar modification through a federal, state and private partnership that will re-establish connectivity for salmon to both the North and South Forks of Battle Creek. Under the Battle Creek Salmon and Steelhead Restoration Project (BCSSRP), the USFWS, the Bureau of Reclamation, the National Marine Fisheries Service (NMFS), and the California Department of Fish and Wildlife (CDFW) have partnered with PG&E to restore 42 miles of habitat in Battle Creek and an additional 6 miles of habitat in its tributaries, while minimizing loss of clean and renewable energy produced by the Battle Creek Hydroelectric Project.

The BCSSRP will remove barriers on the South Fork that will allow fish to migrate to Panther Grade and into the area of the proposed Project bypassed reach all the way to Angel Falls. This reconnection to anadromy is expected to occur around 2021 when PG&E-operated dams on the South Fork of Battle Creek are removed and a fish ladder is opened at the Inskip Diversion Dam, the only dam that will remain on the South Fork of Battle Creek post-restoration.

The Lassen Lodge Project has the potential to negatively affect fish habitat in the proposed Project bypassed reach and negate the efforts that have been made to re-connect salmon to suitable habitat located in the proposed bypassed reach.

ENERGY POLICY ACT OF 2005

On August 8, 2005, Congress enacted the Energy Policy Act of 2005, Pub. L. No. 109-58, which mandates new processes when the Department prescribes fishways pursuant to Section 18 of the Federal Power Act (FPA). The Department's interim final regulations (published 11/17/2005, 70 FR 69804) were revised through publication on March 31, 2015 (80 FR 17155) of revised interim rules, which implement the Energy Policy Act and are codified at 43 C.F.R. Section 45.1 *et seq.* In this proceeding the Department is reserving the Secretary's Section 18 authority to prescribe fishways; consequently, as provided in 43 C.F.R. Section 54.1(c), the Department will not provide hearing or alternative review processes at this time. The Department will provide such processes if (and when) the Department exercises its reserved Section 18 authority during the term of any license that may be issued in this proceeding.

RESOURCE ISSUES AND OBJECTIVES FOR THE PROJECT

General Objectives

The objectives of the USFWS for the Project are:

1. Successful implementation of the BCSSRP all of the way upstream to Angel Falls.
2. Preserve the intent and goals of the BCSSRP.
3. Healthy resident trout and anadromous salmonid populations upstream, downstream and within the Project bypassed reach.
4. Conservation of resident salmonids during times of thermal stress, such as during the summer and during droughts.
5. Doubling of Chinook salmon populations in the Sacramento River system consistent with CVPIA goals.
6. Conservation of ESA-listed species pursuant to section 3 of the ESA, and conservation of ecosystems pursuant to section 2(b) of the ESA.

Specific Objectives

In addition to our general objectives, the USFWS has the following specific objectives for protection and enhancement of Project-affected aquatic and wildlife resources:

1. Minimum instream flows in the bypassed reach that would conserve salmonids and benefit resident fish by maintaining available habitat and enhancing thermal conditions within the South Fork of Battle Creek.
2. Spawning bed enhancement.
3. Prevent entrainment of all life stages of *Oncorhynchus mykiss* into the Project diversion facilities.
4. Ensure that Project operations are not deleterious to habitat needs of Chinook salmon in the Project Area and the Affected Area downstream.

5. Ensure that the Applicant consults with the USFWS and NMFS concerning federally listed species, pursuant to the ESA, and prior to any construction, maintenance and other operations not covered within the new license.
6. Monitor aquatic biological resources within the South Fork of Battle Creek so the effects over time on the natural resources from the new Project can be assessed.
7. Conserve riparian ecosystem function, including flows to floodplain, riparian restoration, introduction and supplementation of large woody debris.
8. Conservation of the federally-listed California red-legged frog, vernal pool fairy shrimp, slender Orcutt grass, and the BGEPA-protected bald eagle and MBTA-protected migratory birds through Applicant-development of plans and best management practices following existing conservation guidelines and/or plans.

The above objectives would be obtained through the implementation of our FPA Terms, as stated in our *Recommendations, Terms and Conditions, and Prescriptions* Section of this letter, through ESA Section 7 consultations; and through BGEPA compliance.

AFFECTED RESOURCES

Aquatic and wildlife resources affected by the Project that are of concern to the USFWS include species federally listed under the ESA and certain non-listed sensitive species.

Federally Listed Species

Species listed under the ESA are likely to be affected by the Project. The federally-listed fish species affected by the Project are under the jurisdiction of NMFS, and the other federally-listed, terrestrial and aquatic species affected by the Project are under the jurisdiction of the USFWS.

The ESA regulations (50 C.F.R. § 402.02) define Action Area as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” To address effects within the Project Area, as defined by the FLA, and Action Area, as defined by the ESA, we refer to effects in both of these areas as a single, larger area and will use the term Affected Area because it includes direct and indirect effects of the license, including operation and maintenance, recreation, and downstream flow and habitat conditions.

Federally Listed Plant Species

The Applicant conducted field surveys of the Project Area May 27 through 31 and June 10 through 12 and September 18, 2013. The Project Area is considered to be the accessible portions of the Project reach in the South Fork of Battle Creek and a 400-foot survey corridor centered on the Project centerline, including the transmission line and, as separate areas, the multipurpose areas outside the project centerline. Field surveys for special-status plant species were conducted during the May and June surveys and habitat suitability to special status plant species was conducted during the May, June and September surveys.

Slender Orcutt Grass - Only one federally-listed plant species has the potential to occur in the Affected Area. Suitable habitat exists within the vicinity of the Project for the threatened slender Orcutt grass and there are known occurrences of this species in the Dales area along Hwy 36.

Federally Listed Fish Species

California Central Valley steelhead DPS (Oncorhynchus mykiss irideus) – The Central Valley-run steelhead trout DPS was listed as threatened on June 28, 2005 (70 FR 37160). Central Valley-run steelhead trout occur in Battle Creek but are blocked from upstream migration at Coleman Diversion Dam. Critical habitat has been designated for this species in Battle Creek including the South Fork of Battle Creek up to Angel Falls within the proposed bypassed reach for the Project. Battle Creek was historical habitat for this species.

Spring-run Chinook salmon ESU – The spring-run Chinook salmon ESU was listed as threatened on June 28, 2005 (70 FR 37160). Spring-run Chinook salmon are known to occur in Battle Creek on the main stem and in the North Fork as documented by snorkel Surveys conducted by the USFWS (Bottaro, 2012). Due to diversions dams on the South Fork spring-run do not presently occur within the bypassed reach. Battle Creek was historical habitat for this species and the Battle Creek Salmon and Steelhead Restoration Project is expected to allow, by the year 2021, spring-run migration into the proposed Project bypassed reach.

Sacramento River winter-run Chinook salmon ESU- Winter-run Chinook was listed as endangered on January 4, 1994 (59 FR 440). Winter-run Chinook salmon historically populated Battle Creek before water resources development extirpated them from this watershed. Currently the only known population of winter-run is artificially maintained through cold water releases from Shasta Dam to their only remaining spawning habitat on the Sacramento River between Keswick Dam and Redding, California.

Historically, winter-run would use the upper reaches of the Sacramento River and sub-basins (the Pit River, McCloud River systems) and Battle Creek because these watersheds provided the cold water necessary for summertime in-gravel egg incubation required by this run of Chinook. Battle Creek restoration is important because it will reestablish the connectivity to historical spawning grounds for the winter-run Chinook and allow winter-run to be reintroduced into Battle Creek after 2020 when restoration will be completed.

Federally Listed Wildlife Species

California red-legged frog (Rana draytonii) – The California red-legged frog was listed as threatened on May 23, 1996 (61 FR 25813). The applicant conducted field site assessments on May 28-19, June 10, and August 20, 2013 using the USFWS Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog (USFWS 2005).

The following locations were included in the RLF assessment: the Project reach and other accessible aquatic habitats within 1-mile of the Project centerline (South Fork Battle Creek Diversion and Intake, Soap Creek, Gun and Rod Club Pond, Manton School Road Pond,

tributary to South Fork Battle Creek, South Fork Battle Creek Powerhouse). California red-legged frogs were not observed during these surveys.

Formal ESA consultation with the USFWS has not been conducted. Habitat conditions that are preferred by the California red-legged frog occur at multiple locations within the Project Affected Area.

Valley elderberry longhorn beetle – The Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) was listed as threatened on August 8, 1990 (45 FR 52803). Mature elderberry plants (*Sambucus spp.*) are suitable habitat for the Valley elderberry longhorn beetle. Valley elderberry longhorn beetle are very difficult to detect, so the USFWS uses evidence of occupancy in the form of exit holes in the stems of elderberry shrubs to determine presence. Field habitat assessments were conducted from May 27 to 31, June 10, and September 18, 2013.

All habitats along the Project were surveyed by meandering transects for a width of 400 feet centered on the Project alignment. Neither the VELB, nor the host plant, elderberry, were observed during field surveys. The closest documented occurrence is approximately 5.7 miles southwest of the Project.

Sensitive Aquatic Species

There are restoration provisions for anadromous salmonids under the CVPIA. Sensitive salmonids that will be affected by the project are:

Central Valley Fall- and Late Fall-run Chinook salmon ESU (O. tshawytscha) – The Central Valley fall- and late fall-run Chinook salmon ESU occur in the mainstem of Battle Creek.

Rainbow trout – Resident rainbow trout (*Oncorhynchus mykiss*) are found in the South Fork of Battle Creek upstream and downstream of the proposed Project reach.

Sensitive Wildlife Species

The Applicant's Threatened, Endangered, and Sensitive Wildlife Species Habitat Assessment (Tetra Tech 2015) was included in the FLA. Presence of sensitive wildlife species in the Affected Area is assumed on the types of habitats found in the vicinity of the Project.

Bald eagle and other MBTA Protected Migratory Birds – Activities associated with Project operations, maintenance, construction or recreation may adversely affect, disturb and/or take bald eagles. Bald eagles are protected by federal law under the MBTA, 16 U.S.C. 703, which is the cornerstone of migratory bird conservation and protection in the United States. The MBTA implements four treaties that provide for international protection of migratory birds. The MBTA protects most native species of birds in the United States, including those likely to occur in the Affected Area.

The MBTA provides that it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg or any such bird protected by the MBTA, unless authorized under a permit issued by the Secretary of the Interior (50 CFR 21.1). Some regulatory exceptions apply. Take is defined in regulations as: “pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.”

The MBTA is a strict liability statute, meaning that proof of intent, knowledge, or negligence is not an element of an MBTA violation. Actions resulting in a “taking” of a protected species are a violation of the MBTA. The MBTA does not specifically authorize the incidental take of migratory birds, and the USFWS does not issue permits authorizing the incidental take of migratory birds. In the absence of a permit from the USFWS, the temporary or permanent possession of protected migratory birds and their carcasses is also a violation of the MBTA (16 U.S.C. § 707, as amended by 18 U.S.C. §§ 3559, 3571.).

Under authority of the BGEPA, 16 U.S.C. 668–668d, bald eagles and golden eagles are afforded additional legal protection. The BGEPA prohibits the take, among other prohibited actions, at any time or in any manner of any bald or golden eagle, alive or dead, or any part, nest, or egg thereof. “Take” under BGEPA is defined as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.” 16 U.S.C. 668c.

Under the BGEPA, “disturb” is further defined as agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior (50 CFR 22.2 & 22.27).

The BGEPA authorizes the USFWS to permit the take of eagles for certain purposes and under certain circumstances, including scientific or exhibition purposes, religious purposes of Indian tribes, and the protection of wildlife, agricultural, or other interests, so long as that take is compatible with the preservation of eagles, 16 U.S.C. 668a.

The USFWS carries out its mission to protect wildlife and plant resources by fostering relationships with entities that have taken effective steps to avoid take, by encouraging others to implement measures to avoid take, and through investigations and enforcement when appropriate. Applicants are encouraged to work closely with the USFWS to identify available protective measures when developing Project plans to safeguard wildlife and to implement those measures where applicable.

Applicants are also strongly encouraged to apply for permits authorizing otherwise prohibited activity, including Special Purpose Utility (SPUT) permits for various actions involving migratory birds, and eagle programmatic take permits where eagle take is possible.

The development and implementation of an avian protection and/or management plan to avoid take of migratory birds, including bald and golden eagles, does not limit or preclude the USFWS from exercising its authority under any law, statute, or regulation. However, the USFWS Office of Law Enforcement focuses its resources on investigating and prosecuting those individuals and companies that do not identify and implement all reasonable, prudent and effective measures to avoid the take of migratory birds (including eagles) and then subsequently take individuals of such species.

Ultimately it is the responsibility of those involved with the planning, design, construction, operation, maintenance, and decommissioning of projects to conduct relevant wildlife and habitat evaluation and determine, which, if any, species may be affected, and to seek and obtain necessary permits to avoid liability.

The USFWS is recommending at this time that the Applicant develop and implement a Bald Eagle Management Plan for the Lassen Lodge Hydroelectric Project (See FLA Condition 5).

Invasive/Noxious Plant Species Management

One of the USFWS's specific objectives is to ensure that invasive and noxious plants are eradicated or controlled so as to minimize the impacts of these particular plant species on the aquatic and terrestrial habitats of common, sensitive, and listed fish and wildlife species.

Terrestrial Invasive/Noxious Plants – Terrestrial invasive plants found in the Project Area are: Red brome (*Bromus madritensis*), tocalote [Maltese star thistle](*Centaurea melitensis*, Iberian starthistle (*Centaurea iberica*), yellow starthistle (*Centaurea solstitialis*), medusahead grass (*Taeniatherum caput-medusae*), common wild oats (*Avena fatua*), ripgut brome (*Bromus diandrus*), cheatgrass (*Bromus tectorum*), canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), annual dogtail (*Cynosurus echinatus*), rattail sixweeks grass (*Festuca (Vulpia) myuros*), Mediterranean hoary mustard (*Hirschfeldia incana*), velvetgrass (*Holcus lanatus*) foxtail barley (*Hordeum murinum*), oxeye daisy (*Leucanthemum vulgare*), common St Johnswort (*Hypericum perforatum*), pennyroyal (*Mentha pulegium*), Himalayan blackberry(*Rubus armeniacus*), sheep sorrel (*Rumex acetosella*), and hedge parsley (*Torilis arvensis*).

The USFWS supports the application development of the Noxious Weed Management and Revegetation Plan (Tetra Tech 2014) submitted by the Applicant. Part of the plan includes noxious weed monitoring for two years following construction. The information obtained from the monitoring will be used to determine if the noxious weed control, in temporarily disturbed areas, is reaching the goal of less than 20% cover of noxious weeds in year 1 post-construction, and less than 10% cover of noxious weeds in year 2 post-construction. The USFWS recommends continuation of the control program beyond year 2 until the goal of less than 10% cover of noxious weeds is achieved.

The Noxious Weed Management Plan also calls for post-construction revegetation monitoring for 2 years post-construction concurrent with the noxious weed monitoring. The USFWS recommends that if the revegetation goal of 70% cover within the seeded areas is not achieved

by year 2, reseeded be conducted as proposed and that the monitoring and reseeded, if necessary, continue until the year 2 revegetation goal is achieved.

In addition, the USFWS recommends that the noxious weed monitoring and revegetation monitoring reports be filed with the Commission and distributed to the service list for the Lassen Lodge Project.

COMMENTS ON THE FINAL LICENSE APPLICATION

The FLA for the Project contains multiple documents and appendices. The following comments apply to the specified Exhibit or Appendix listed at the beginning of the Comment.

Exhibit A, Project Description, Page A-2, Section 1.1.2. Intake Structure – The Applicant should prepare a management plan for the material described in this paragraph as “debris” (that actually might include large woody material) accumulating on the trash screen. Large woody material (LWM) is important to sustaining salmonid populations, because insect biomass from in-water decomposition significantly enhances juvenile salmonid recruitment (Cederholm *et al.* 2000). Instream woody material provides escape cover and relief from high current velocities for juvenile salmonids. Instream cover for juvenile salmonids has been shown to be important for fish survival and growth (Sedell *et al.* 1990, Shirvell 1994). Having a clear understanding of the contribution of LWM from upstream sources is an important consideration for determining the effects of Project O&M on juvenile salmonids and resident trout.

LWM creates both micro- and macro-habitat heterogeneity by forming pools, back eddies and side channels and by creating channel sinuosity and hydraulic complexity. This habitat complexity provides juvenile salmonids numerous refugia from predators and water velocity, and provides efficient locations from which to feed. LWM also contributes to the contribution of invertebrate food sources, and micro-habitat complexity for juvenile salmonids (NMFS 2007).

In addition, stockpiled LWM may be attractive to California Red-legged frogs. Wood collection, storing, and transporting or burning in or adjacent to California red-legged frog habitat can affect California red-legged frogs in a number of ways. If the wood piles become occupied by California red-legged frogs, individual frogs could be burned or crushed by wood removal actions. If the wood piles become occupied by bullfrogs (*Rana catesbiana*), California red-legged frogs seeking refuge in the wood piles could become eaten by bullfrogs or engage in false-mating attempts.

Exhibit A, Project Description, Page A-8, Section 2.2 Bypass Reach – The FLA incorrectly characterizes the fish passage potential at Panther Falls. The reach between Angel Falls and Panther Grade is part of the area being restored under the BCSSRP, which is a component of the Battle Creek Hydroelectric Project (FERC Project No. P-1121). The BCSSRP addresses fish barriers on North Fork and South Fork Battle Creek for the conservation of Chinook salmon and steelhead trout. The BCSSRP plans to remove, by 2021, Coleman and South Diversion Dams, which are the last man-made barriers to anadromous fish in South Fork Battle Creek.

Under the BCSSRP, the Department , the USFWS, the Bureau of Reclamation, the National Marine Fisheries Service (NMFS), and the California Department of Fish and Wildlife (CDFW) have partnered with PG&E to restore 42 miles of habitat in Battle Creek and an additional 6 miles of habitat in its tributaries, while minimizing loss of clean and renewable energy produced by the Battle Creek Hydroelectric Project.

The BCSSRP is being supported by approximately \$45 million in federal funding (from CALFED and the American Recovery and Reinvestment Act of 2009); \$6.5 million in federal/state funding (from Iron Mountain Mine Trustee Council); approximately \$58 million in state funding (from CDFW; the California Wildlife Conservation Board, the California Department of Transportation, and the California Department of Water Resources); and \$3 million in private funding (from the Packard Foundation, via The Nature Conservancy). PG&E is contributing to the Restoration Project in the form of foregone energy generation (\$20.6 million), voluntarily pursuing amendments to the Battle Creek Hydroelectric Project's Federal Energy Regulatory Commission license, and transferring certain water rights to CDFW.

Exhibit E, Environmental Report, Benthic Macroinvertebrates (BMI) – The Project impacts to benthic macroinvertebrates are not addressed in this document. The primary energetic drivers of riparian ecosystem function are organic matter from riparian vegetation and riparian insects and marine-derived nutrients from anadromous fish (Allan *et al.* 2003, Cederholm *et al.* 2000, Cummins *et al.* 1989, Pozo *et al.* 1997, Ward and Stanford 1995).

Ecological processes involving riparian habitat function to enhance food quantity and availability. For example, Cummins *et al.* (1989) describe a suite of invertebrate taxa grouped in a category called “shredders” that is an important component of the invertebrate community biomass in rivers. Shredders feed on “conditioned” plant litter that has been leached in the aquatic environment and colonized by microorganisms, with the conditioning taking “. . . from weeks to months depending upon plant species and stream temperature” (page 24 of Cummins *et al.* 1989).

Many common prey species, for both adult and juvenile salmonids, fall into the category of shredders (*i.e.*, amphipods, isopods, stoneflies, caddisflies, and some mayflies). Shredders convert organic matter (*e.g.*, leaves, twigs, and woody debris) into fine particulate organic matter. Short and Maslin (1977) found that the fine particulate organic matter contribution made by shredders contributed significantly to the food resource base for the invertebrate “collectors” that are also important prey for juvenile and adult salmonids. Consequently, the ecological chain of shredders, conditioners, and collectors allows the riparian ecosystem to provide prey biomass to both the main channel and to off-channel areas.

The BMI association with LWM is well-established in the literature, as is the importance of BMI to juvenile salmonids and resident trout (Cederholm *et al.* 2000, Crispin *et al.* 1993, Short and Maslin. 1977, Wipfli and Baxter 2010). Removal of LWM from Project facilities, and preventing that LWM from contributing to BMI as a food source for salmonids, is a Project effect that should not be overlooked.

Hydropower effects on BMI are also well-established in the literature (Cushman 1985, Fisher and Lavoy 1972, Moog 1993, Rehn *et al.* 2007, Weisberg *et al.* 1990).

Exhibit E, Environmental Report, Page E-169 Consultation Record – Initiation of ESA section 7 consultation with the USFWS has yet to occur for: (1) the threatened California red-legged frog, (2) vernal pool fairy shrimp, and (3) slender Orcutt grass. Pursuant to 50 CFR 402.14, the USFWS requests ESA consultation for these species and critical habitats.

Appendix E Red-Legged Frog Assessment, Page 6-1. Conclusions – This assessment overlooks the established fact that hydroelectric project dams, impoundments, afterbays, and changing of aquatic conditions are key factors in the establishment of bullfrogs. Hydroelectric projects enhance habitat conditions for the bullfrog at the expense of native amphibians. Diversion dams also create warm water conditions that allow for establishment of bullfrog populations in areas where they would not exist, or would be in very low numbers, under natural flow conditions (Fuller *et al.* 2010). The USFWS is concerned that the Project provides conditions that favor bullfrog establishment, either extirpating local California red-legged frog populations or putting constant pressure on California red-legged frog populations and keeping their numbers low.

Bullfrogs were introduced into California over a century ago, in response to commercial overharvest of California red-legged frogs. At the time of ESA-listing of the California red-legged frog, bullfrogs were “considered to be a significant and widespread threat” (USFWS 1996). Several researchers in central California have noted the decline and eventual disappearance of California red-legged frogs once bullfrogs become established at the same site (Jennings and Hayes 1990, Moyle 1973, Fisher and Schaffer 1996).

Bullfrogs prey on California red-legged frogs (Twedt 1993), and may have a competitive advantage over California red-legged frogs because of their larger size, generalized food habits (Bury and Whelan 1984), and extended breeding season (Storer 1925) that allows for production of two clutches of up to 20,000 eggs during a breeding season (Emlen 1977). We enclose Finkle (2012, Attachment 1) and Fuller *et al.* (2010 Attachment 2) for consideration by the Commission regarding Project effects on California red-legged frogs from operations that support bullfrog establishment and dispersal.

Bullfrogs have a high dispersal capacity. Habitat or life-history changes, such as water drawdown or metamorphosis, affect bullfrog behavior and can trigger dispersal. Two types of bullfrog dispersal events are likely to occur within the FERC Project Area. The first is dispersal of juvenile bullfrogs following their spring metamorphosis period. If the conditions are optimal, thousands of bullfrog metamorphs/juveniles are likely to disperse from bullfrog breeding habitat into California red-legged frog habitat of all types.

The second type of dispersal occurs when water levels drop and adult bullfrogs disperse away from breeding habitat. This second type of dispersal event is likely to be a greater stressor on local California red-legged frog populations, because adult bullfrogs prey upon California red-legged frogs and outcompete with them for food resources.

Adult bullfrogs also stimulate false-breeding attempts in California red-legged frogs, which reduce individual reproductive fitness.

Fortunately, California red-legged frog populations respond well to bullfrog control (USFWS 2004). Also, in spite of the population pressures that bullfrogs place on them, California red-legged frogs are typically able to persist: (1) in sub-optimal habitat where conditions are unfavorable to bullfrogs; (2) in marginal habitat adjacent to bullfrog-occupied areas; (3) where habitat is managed to reduce establishment of bullfrogs; or (4) where bullfrog control has been implemented. In areas where bullfrogs and California red-legged frogs co-occur, surveys typically detect high numbers of bullfrogs and low or undetectable numbers of California red-legged frogs. In these same areas, bullfrog removal and/or management have led to resurgence in the California red-legged frog population.

Because California red-legged frogs often persist in marginal habitat adjacent to bullfrog-occupied areas, it is premature to conclude that marginal habitat would not be occupied by California red-legged frogs even though the survey did not detect any. Lack of records on California red-legged frog occurrence does not equate to the species not being present. The survey also did not find any foothill yellow-legged frogs which are known to occur in the area surveyed. If bullfrog dispersal is not quantified, it is premature to conclude that the Project will not affect California red-legged frogs within the 1-mile action area boundary. Project operations, including promoting conditions that support bullfrog establishment and dispersal, may affect California red-legged frogs.

RECOMMENDATIONS, TERMS AND CONDITIONS, AND PRESCRIPTIONS

The USFWS seeks to ensure that appropriate levels of resource protection are incorporated in any new license and is of the view that our Section 18 Prescriptions for Fishways and Section 10(j) Conditions will go toward protecting, mitigating, and enhancing fish and wildlife resources in the Affected Area. ESA issues will be addressed through the Commission's compliance with Section 7 of the ESA.

Federal Power Act Section 18

The Department submits the following article to be included in the License under the Secretary's mandatory Section 18 authority:

Reservation of Section 18 Authority Article

Authority is reserved for the Department to prescribe the construction, operation, and maintenance of fishways at the Project, including measures to determine, ensure, or improve the effectiveness of such prescribed fishways, pursuant to Section 18 of the FPA, as amended, during the term of the Project license.

Justification for Reservation of Section 18 Authority Article

Pursuant to Section 18 of the FPA, the Commission shall require the construction, maintenance, and operation by an Applicant at its own expense of such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce, as appropriate (16 U.S.C. § 811). The Secretary of the Interior is exercising her Section 18 authority through the inclusion in the license of a separate license article that reserves the Secretary's authority to prescribe fishways, over the term of the license, pursuant to Section 18 of the FPA.

Federal Power Act Section 10(j) Conditions

In order to adequately protect, mitigate, and enhance fish and wildlife (including related spawning grounds and habitat) affected by the development, operation, and management of the Project, the Commission is to include in any license conditions for such protection, mitigation, and enhancement based upon recommended conditions received pursuant to the FWCA, from the USFWS, NMFS, and CDFW (16 U.S.C. § 803(j)). Pursuant to this authority, the USFWS submits for inclusion in any new license issued for the Project, the following conditions to protect, mitigate, and enhance fish and wildlife resources that are affected by the Project. These conditions were developed by the USFWS to address resource issues associated with the Project as previously identified in the *Affected Resources* Section.

The USFWS prepared these preliminary conditions based on current information regarding the proposed licensing of the Project. If new information becomes available that may significantly affect the adequacy of the proposed measures, the USFWS may modify these Section 10(j) Conditions. The USFWS reserves the right to recommend modifications to these Section 10(j) Conditions as needed to meet its statutory obligations in light of changed situations and to be consistent with finalized design plans, new information developed as a result of the Commission's environmental review process, or to correct deficiencies or problems found during post-license monitoring or evaluation.

The USFWS 's recommended Section 10(j) Conditions and supporting justifications that serve to assist us in meeting the general and specific objectives are presented below.

FPA § 10(j) Condition 1: Minimum Instream Flow in the Bypassed Reach

(A) The Applicant shall deliver, once the Project begins power generation, a year-round minimum instream flow (MIF) in the bypassed reach of 35 cubic feet per second (cfs) during Project operations, or the natural flow (if the natural flow is less than 35 cfs), in order to provide for habitat connectivity and fish passage within the bypassed reach.

(B) The Applicant shall monitor the MIF at select gages (see §10(j) Condition #2, Flow Monitoring Plan):

- 1) At a gage located at the Diversion Dam and
- 2) At gages located both upstream and downstream of Angel Falls.

(C) Flow changes to the amount of water diverted or the amount of water returning to Battle Creek from the Project facilities shall be ramped at a rate no greater than one-inch per hour, based on a gage located between Angel Falls and Powerhouse Spring No. 4.

Justification for FPA § 10(j) Condition 1: Minimum Instream Flow (MIF) in the Bypassed Reach

(A) Applicant's Final License Application (FLA):

Page 47 of the *FLA, Appendix C: Stream Flows and Potential Production of Spring-Run Chinook Salmon and Steelhead in the Upper South Fork of Battle Creek (Cramer and Ceder 2013)*, states that Sellheim and Cramer (2013) identified several locations within the Project reach where passage was not possible when flow was only 13 cfs. On the same page, the report indicates that “*modest flows of 30-50 cfs (and possibly less) would be sufficient to enable passage between all channel units within the project reach... that flows of 10 cfs will provide spawning capacity capable of producing far more age-1 parr than the rearing capacity can support... that bypass flows in the range of 10-13 cfs would be sufficient to support a vibrant population of rainbow trout.*” On page 48 of Appendix C, the statement is made that *Occasional higher flows reaching 30-50 cfs would be desirable, based on professional judgment, to ensure that resident trout can move between channel units within the reach.*” And on the same page this statement regarding adequate passage is made, “*...bypass flows in the range of 30-60 cfs should be sufficient to provide adequate passage opportunities for trout to move about within the reach to position themselves for spawning.*”

The FLA states that the proposed MIF of 13 cfs would, “*...provide spawning capacity capable of producing far more age-1 parr than the [local] rearing capacity can support*” but that 13 cfs would not be sufficient to enable passage between all channel units within the Project reach. Salmonid juveniles would naturally tend to move downstream, out of the Project's bypassed reach, to find suitable rearing habitat if they are able to move between channel units.

The MIF should include the flows necessary for salmonid passage/migration, spawning, rearing, and holding, which as stated on Page 48, appears to be 3-5 times higher than the Applicant's proposed MIF of 13 cfs. The enclosed Excel document (Attachment 3) provides support for our proposed 35 cfs MIF (). The Excel document contains flow vs habitat (PHABSIM) modeling that was developed by the USFWS using bypassed reach data provided by Cramer Fish Sciences (CFS, personal communication, 2015).

The maximum average habitat for Chinook and steelhead fry and juvenile life stages occurs at 35 cfs within the bypassed reach (assuming suitable water temperatures). In addition, our §10(j) Condition #2, *Water Temperature Monitoring*, proposes that suitable water temperatures should be based on the USEPA's (2003) 7 day average of the daily maxima (7DADM) criteria.

Thus, USFWS is convinced that the MIF in the bypassed reach should be 35 cfs based on PHABSIM modeling and not be based on the capacity of the local rearing habitat. The 35 cfs MIF will more likely ensure that the USFWS resource objectives for the Project are met.

FPA § 10(j) Condition 2: Water Temperature Monitoring

- (A) Within 1 year of license issuance and after consultation with the Resource Agencies (USFWS, NMFS, CDFW), the Applicant shall file with the Commission a *Water Temperature Monitoring Plan* (WTMP) that shall designate existing water temperature gages (or new gages if needed) that would be used to monitor instream water temperatures between just upstream of the Diversion Dam and just downstream of Panther Grade, at the locations listed in (C) of this Condition, for the duration of the license. Temperatures will be measured and recorded in a way that will facilitate determining compliance with the temperature criterion stated in (F) below. The WTMP shall also describe the frequency and the means by which recorded temperature data will be made available for review by the Commission and the Resource Agencies. The WTMP shall describe how the Commission and the Resource Agencies will be notified if the temperature criterion is exceeded.
- (B) A draft of the WTMP shall be provided to the Resource Agencies for a 60-day review. The Applicant shall incorporate the Resource Agencies comments into a Final WTMP within a 45-day period and file the Final Plan, along with documentation of Resource Agency consultations, with the Commission. The Applicant shall include a discussion of any comments and recommendations, including a discussion of any measures not included in the Final WTMP. The Applicant shall implement the Final WTMP upon approval by the Commission.
- (C) The locations of water temperature gages shall be as follows:
- 1) Just upstream of the Diversion Dam;
 - 2) At the intake's header box, recording what is being diverted into pipeline;
 - 3) Just upstream of Angel Falls;
 - 4) Upstream of Powerhouse Spring Number 4, just downstream of Angel Falls;
(between Angel Falls and Powerhouse Spring No. 4);
 - 5) At the Powerhouse discharge (what the powerhouse is discharging);
 - 6) Just downstream of the Powerhouse (or just upstream of Panther Grade);
 - 7) Just downstream of Panther Grade.
- (D) The water temperature in the Project's bypassed reach is not to exceed the 18°C 7DADM USEPA (2003) water temperature criteria at any time. When necessary to maintain this temperature, the Project's operations shall put more water into the bypassed reach by reducing the diversion rate, reducing power production, or shutting down power generation. Should the maximum temperature criterion be exceeded, the Commission and the Resource Agencies will be notified within 24-hours using the contact procedures developed in the WTMP.
- (E) The compliance point for the 7DADM water temperature criteria shall be measured using gages both upstream and downstream of Angel Falls.
- (F) Post-license water temperature monitoring shall determine whether the USEPA (2003) 7DADM criteria are met. If the EPA (2003) 7DADM criteria are not met, the Applicant

shall implement increased MIF until they are met. The Applicant shall report to the USFWS and NMFS weekly until the EPA (2003) 7DADM criteria are met. If water is not available to comply with the EPA (2003) 7DADM criteria, or if upstream temperature exceeds the criteria, the Applicant shall implement streambed and riparian restoration to provide additional shading to reduce instream water temperatures.

- (G) If riparian restoration is needed in order to meet the EPA (2003) criteria, a restoration design shall be provided to the Resource Agencies for a 60-day review. The Applicant shall incorporate the Resource Agencies comments into the restoration design within a 45-day period and file the restoration design, along with documentation of Resource Agency consultations, with the Commission. The Applicant shall include a discussion of any comments and recommendations, including a discussion of any measures not included in the Final FGMP. The Applicant shall restore riparian habitat consistent with the restoration design upon approval by the Commission.

Justification for FPA § 10(j) Condition 2: Water Temperature Monitoring

Water temperature monitoring, via a set of gages, is necessary to assure the Project's operations do not adversely affect native salmonids, and determine whether measures are needed as to enhance and protect salmonid resources, including ESA-listed species and designated critical habitats. Ensuring that suitable water temperatures are maintained and adjusted as needed (via increased flows) serves to achieve USFWS Resource Objectives for the Project, including protection of the USFWS's long-term investment in restoring South Fork Battle Creek.

In an unaltered system, salmonid juveniles would naturally tend to move downstream, out of the Project's bypassed reach, to find suitable rearing habitat if they are able to move between channel units. Because the Project would prevent this type of migration and habitat selection, the instream water temperatures' should include the flows and/or the riparian shading necessary for salmonid passage/migration, spawning, rearing, and holding.

FPA § 10(j) Condition 3: Flow Gage Monitoring Plan

- (A) Within 1-year of License issuance, after consultation with the Resource Agencies (USFWS, NMFS, and CDFW) the Applicant shall develop and implement a Flow Gage Monitoring Plan (FGMP). The FGMP shall designate existing flow gages (or new gages if needed) that would be used to monitor MIFs between upstream of the Diversion Dam and downstream of Panther Grade. The flows will be measured and recorded in a way that will facilitate MIF compliance determination. The FGMP shall also describe the frequency and the means by which recorded flow data will be made available for review by the Commission and the Resource Agencies. The FGMP shall describe how the Commission and the Resource Agencies will be notified within 24 hours if the MIF is not met.
- (B) A draft of the FGMP shall be provided to the Resource Agencies for a 60-day review. The Applicant shall incorporate the Resource Agencies comments into a Final FGMP within a 45-day period and file the Final FGMP, along with documentation of Resource Agency consultations, with the Commission. The Applicant shall include a discussion of any

comments and recommendations, including a discussion of any measures not included in the Final FGMP. The Applicant shall implement the Final FGMP upon approval by the Commission.

- (C) The locations of flow gages shall be as follows:
- 1) Just upstream of the Diversion Dam;
 - 2) At the intake's header box, recording what is being diverted into pipeline;
 - 3) Just upstream of Angel Falls;
 - 4) Upstream of Powerhouse Spring Number 4, just downstream of Angel Falls (between Angel Falls and Powerhouse Spring No. 4);
 - 5) At the Powerhouse discharge (what the powerhouse is discharging);
 - 6) Just downstream of the Powerhouse (or just upstream of Panther Grade);
 - 7) Just downstream of Panther Grade.

Justification for FPA § 10(j) Condition 3: Flow Gage Monitoring Plan

Flow gaging is necessary to monitor compliance with license conditions. Ensuring that prescribed flows are maintained and adjusted as needed serves to achieve USFWS Resource Objectives for the Project.

FPA § 10(j) Condition 4: Salmonid Monitoring Plan

- (A) Within 90 days of License issuance, the Applicant shall develop and implement, in consultation with the Resource Agencies, a Salmonid Monitoring Plan (SMP) to quarterly monitor the presence of all life stages of both anadromous and resident salmonids within the bypassed reach. Standard fisheries sampling techniques shall be used in the implementation of the SMP (Kohler and Hubert 1999).
- (B) The SMP consists of the following actions to monitor for both anadromous and resident salmonids:
- 1) Snorkel Surveys: The Applicant shall design and implement snorkel surveys once per quarter (seasonally) within the entire bypassed reach to enumerate any salmonids present. The design and implementation of the SMP shall be done, in consultation with the Resource Agencies, using standard techniques, and the results shall include types, numbers, and size-classes of fish observed (Kohler and Hubert 1999).
 - 2) Inform Agencies: The Applicant shall inform the commission and the Resource Agencies (Agencies) when they anticipate implementing the snorkel surveys.
- (C) Reporting: The Applicant shall inform the Agencies if either steelhead/rainbow trout (*O. mykiss*) and/or Chinook salmon (*O. tshawytscha*) are present within the bypassed reach as soon as possible, via email or telephone. Upon completion of the snorkel surveys, the Applicant shall produce a draft report containing the methods and results of the snorkel surveys to the Agencies for review. Results shall include types, numbers, and size-classes

of fish observed (Kohler and Hubert 1999). The Applicant shall incorporate the Agencies' comments and provide a final report to the Agencies.

- (D) Management to Protect Salmonid Resources: The snorkeling information will be used by the Resource Agencies to assess the Project's impacts on salmonids present within the bypassed reach. This information will be used to assist in the streambed enhancement and riparian restoration which may be need under conditions 2.

Justification for FPA § 10(j) Condition 4: Salmonid Monitoring Plan

Monitoring for resident *O. mykiss*, steelhead, and any Chinook salmon within the bypassed reach via snorkeling actions is necessary to adaptively manage the Project's operations so as to enhance and protect salmonid resources, including ESA-listed species and designated critical habitats. Surveys should be done quarterly to capture any seasonal variations. The quarterly salmonid monitoring upstream of Angel Falls is necessary because any *O. mykiss* residents can exhibit anadromous behavior and emigrate downstream, adding to the potential wild gene pool of both steelhead and resident *O. mykiss*.

In addition, USFWS believes that quarterly salmonid monitoring downstream of Angel Falls serves to assess the Project's impacts on not only any resident *O. mykiss*, but more importantly, assess the Project's effects on ESA listed salmonids and their designated critical habitats. If ESA-listed salmonids are detected downstream of Angel Falls, then the Project's operations may need to be adaptively managed to protect these ESA-listed species and their designated critical habitats.

FPA § 10(j) Condition 5: Benthic Macroinvertebrate Monitoring Plan

(A) Within 1 year of license issuance, and after consultation with the Resource Agencies (USFWS, NMFS, and CDFW), the Applicant shall file with the Commission a *Benthic Macroinvertebrate Monitoring Plan (BMMP)* describing sampling to be conducted in the Project-affected bypassed reaches. Surveys shall be conducted at least one year prior to construction and in years 1 through 4 and every 4 years thereafter through the term of the license (unless an alternative monitoring schedule is approved in consultation with the Resource Agencies).

(B) A draft of the BMMP shall be provided to the Resource Agencies for a 60-day review. The Applicant shall incorporate the Resource Agencies comments into a *Final BMMP* within a 45-day period and file the Final Plan, along with documentation of Resource Agency consultations, with the Commission. The Applicant shall include a discussion of any comments and recommendations, including a discussion of any measures not included in the Final Plan. The Applicant shall implement the Final Plan upon approval by the Commission.

(C) The BMMP will be used to assess the effects to the macroinvertebrate community in the Project bypassed reaches under new flow regimes and other changes stipulated by the new license. Specifically, the plan shall describe the methods the Applicant will use to monitor

benthic macroinvertebrate species composition and relative abundance. Data will be used to determine trends in the macroinvertebrate community structure, as represented by metrics (*e.g.*, taxa richness, EPT index, tolerance value), in the California Stream Bioassessment Procedure (Harrington 2003) and determine the trends in metrics within reaches, between reaches, and in comparison with previous results.

(D) When scheduling sampling site selection or field data collections, the Applicant shall notify the Resource Agencies at least 30-days in advance to provide the opportunity to participate or observe. If field conditions or operational situations preclude a 30-day notification, the Applicant will provide notice as far in advance as feasible.

(E) The Applicant shall provide results of benthic macroinvertebrate monitoring to the Resource Agencies in a technical report following completion of each sampling effort. In addition to describing the results, the report shall compare the results with those of previous surveys.

(F) If BMI total biomass, taxa richness, or EPT index decreases by more than 50 percent following construction of the project, the Applicant shall prepare a riparian restoration plan (RRP) targeted at increasing BMI. The RRP shall be provided to the Resource Agencies for a 60-day review. The Applicant shall incorporate the Resource Agencies comments into the RRP within a 45-day period and file the RRP, along with documentation of Resource Agency consultations, with the Commission.

The Applicant shall include a discussion of any comments and recommendations, including a discussion of any measures not included in the RRP. The Applicant shall restore riparian habitat consistent with the RRP upon approval by the Commission.

Justification for § 10(j) Condition 5: Benthic Macroinvertebrate Monitoring Plan

Aquatic BMI assemblages are communities of aquatic macroinvertebrates that serve as "sensitive species assemblages." BMI are an integral part of a stream's ecosystem, are important food sources for resident stream fish, and the quality of the BMI community and its structure reflects the degree of impairment that exists within a stream's ecosystem.

The Benthic Macroinvertebrate Monitoring Plan will be used to assess the effects to the macroinvertebrate community in the Project bypassed reach under new flow regimes and other changes stipulated by the new license. BMI data will be used to determine trends in the macroinvertebrate community structure, as represented by metrics (*e.g.*, taxa richness, EPT index, tolerance value) in the California Stream Bioassessment Procedure (Harrington 2003), and to determine the trends in metrics within reaches and between reaches.

Project impacts can be assessed by (1) describing differences in BMI assemblages at study sites upstream and downstream of Project facilities and (2) identifying the Project's effects on the invertebrate community by comparing BMI assemblages across study sites and to reference sites.

BMI are essential for salmonid reproduction and foraging (Allan *et al.* 2003, Cederholm *et al.* 2000, Cummins *et al.* 1989, Pozo *et al.* 1997, Ward and Stanford 1995). Without invertebrate contribution from the riparian edge or overstory, food availability for salmonids is severely limited (Weiland and Hayward 1997). It is the ecological processes of the riparian habitat, combined with appropriate water temperatures, which function to enhance food quantity and availability for salmonids

EPA § 10(j) Condition 6: Debris and Sediment Management

(A) Within 1 year of License issuance, and after consultation with the Resource Agencies (USFWS, NMFS, CDFW) the Applicant shall file with the Commission a Debris and Sediment Management Plan (DSMP). The DSMP shall describe the operations and actions that would ensure the periodic downstream transport of substrates would occur past the Project's dam. Such substrates include small and large woody debris (S/LWD) and sediment that becomes trapped behind the Project's dam.

(B) A draft of the DSMP shall be provided to the Resource Agencies for a 60-day review. The Applicant shall incorporate the Resource Agencies comments into a Final DSMP within a 45-day period and file the Final DSMP, along with documentation of Resource Agency consultations, with the Commission. The Applicant shall include a discussion of any comments and recommendations, including a discussion of any measures not included in the Final DSMP. The Applicant shall implement the Final DSMP upon approval by the Commission.

(C) The two main actions in the DSMP include the following:

- 1) Sediment: The License shall operate the sluicing gate in the dam periodically during high flows such that accumulated sediment can continue downstream. The DSMP shall provide details of this operation and when it would be implemented.
- 2) Small/Large Woody Debris: Periodically, after high flows have receded, the Applicant shall remove S/LWD, impinged on or blocked by the dam, and place it downstream of the dam and back into the active channel. The DSMP shall provide details of this operation and when it would be implemented.
- 3) The plan shall include a monitoring component to measure the sediment retention upstream of the sluicing gate, the debris and sediment distribution downstream of the dam, and riparian response to the new conditions resulting from the Project. At a minimum, the downstream monitoring shall include: (1) Reach-wide parameters (e.g., total length and gradient, average width and depth; (2) wetted width of each riffle; (3) water velocity; (4) relative substrate composition (i.e., fines, gravel, cobble, boulder, and bedrock); (5) a pebble count; (6) substrate consolidation and percent embeddedness; (7) canopy cover; (8) canopy height; and (9) diameter at breast height of canopy trees shading the stream.

Justification for § 10(j) Condition 6: Debris and Sediment Management Plan

(A) Sediment Management:

The Applicant proposes to have a sediment/gravel sluicing gate as part of its dam. Thus, while salmonid spawning gravel transport would be interrupted by the Project's dam, such sediment would be allowed seasonally to move downstream during high flow events. This term ensures that the Applicant operates the sediment sluicing gate at appropriate, seasonal, high-flow periods.

The availability of suitable spawning gravel downstream of dams is necessary to mitigate and minimize direct, indirect, and cumulative impacts of a Project's facilities and operations on sediment movement and deposition, river geometry, channel characteristics, and BMI communities. This includes impacts on stream competence, capacity, flood plain conductivity, bank stability and extent, duration, and repetition of high flow events.

In addition, this includes impacts to habitat diversity and complexity such as pool/riffle sequencing, availability of suitable salmonid spawning gravels, and instream cover as well as the quality of BMI/forage communities. Suitable spawning habitat typically consists of gravels of a size that are movable by females during redd construction, low levels of fine sediment accumulation, and gravel permeability sufficient to allow minimum intra-gravel dissolved oxygen and water velocity requirements of salmonid eggs (Kondolf 2000a; 2000b; Merz and Setka 2004).

(B) S/LWD Management: Streamflow in the vicinity of LWD develops complex structures that promote gravel deposition, substrate rejuvenation, and hyporheic flows (Abbe *et al.* 2003; Bryant *et al.* 2005). Anchored or lodged LWD can create complex in-channel hydraulics that promote zones of scour and deposition, creating accumulations of spawning gravels for Pacific salmon, providing hydraulic refugia (Bisson *et al.* 1987), and creating pools by forcing flows to scour channel beds and banks. Such processes also create cover and refugia zones for juvenile fish rearing and adult fish holding (Roni and Quinn 2001).

Channel complexity and habitat heterogeneity associated with individual LWD pieces and aggregations offers all salmonid life stages hydraulic and thermal refugia, structural partitioning that provides protection from predation, and visual isolation that lowers interspecies competition (Dolloff 1983). The wood itself supplies nutrients and substrate for aquatic organisms (Anderson *et al.* 1978). Moreover, structural properties of LWD are a factor in the retention of salmonid carcasses, which provide important marine-derived nitrogen (N) to N-limited terrestrial ecosystems and organic nutrients to salmon juveniles, macroinvertebrates, terrestrial animals, and birds (Naiman *et al.* 2002; Merz and Moyle 2006).

(C) Monitoring: The nature of sediment pass-through devices is that they become impacted over time by the various shapes and sizes of sediment moving through. Over time these devices can fail, causing sediment and rough material to be caught behind the dam. In order to assure that the sediment pass-through device continues to be effective and operational, monitoring is needed.

At a minimum, the downstream monitoring shall include: (1) Reach-wide parameters (e.g., total length and gradient, average width and depth; (2) wetted width of each riffle; (3) water velocity; (4) relative substrate composition (i.e., fines, gravel, cobble, boulder, and bedrock); (5) a pebble count; (6) substrate consolidation and percent embeddedness; (7) canopy cover; (8) canopy height; and diameter at breast height of canopy trees shading the stream.

Downstream monitoring is needed to quantify Project effects on the dewatered reach. The data collected in the riparian monitoring will allow for tracking to determine changes over time in lateral distribution of riparian species and the relative contribution of the riparian overstory to salmonid habitat. Of particular interest will be the changes in substrate composition and distribution, changes in canopy biomass and cover, and the presence or absence of mature canopy trees in areas with substrates capable of supporting them.

Riparian habitat is critically important for juvenile salmonids, because it provides food, cover, refugia from high flows, and thermal diversity to enhance growth. Terrestrial in-fall from riparian invertebrates contributes to the energetics of the river and to the salmonid food web (Allan *et al.* 2003) and biomass from in-water decomposition significantly enhances juvenile salmonid recruitment (Cederholm *et al.* 2000). Access to a productive floodplain and riparian area results in positive, population-level effects to steelhead trout (Hayes *et al.* 2008), and the benefit of off-channel and floodplain access to Chinook salmon survivorship has been well established (Jeffres *et al.* 2008, Limm and Marchetti 2009, Sommer *et al.* 2004).

(D) Goals and Objectives: Finally, ensuring that sediment and S/LWD can periodically be transported downstream of the Project's dam will benefit all salmonid resources and habitats. In addition, such substrate transport also serves to achieve USFWS Resource Management Goals and Objectives for the Project (detailed in Attachment C)

FPA § 10(j) Condition 7: Bald Eagle Management Plan and Avian Protection Plan

(A) Within 1 year of license issuance, and after consultation with the USFWS, the Applicant shall file with the Commission a Bald Eagle Management Plan (BEMP) and Avian Protection Plan (APP) that are consistent with the National Bald Eagle Management Guidelines and incorporates protection measures developed by the Avian Powerline Interaction Committee (APLIC). The BEMP shall describe the surveys and protection measures to be conducted and implemented by the Applicant in the Affected Areas where eagles may be adversely affected, disturbed or taken by construction, operations and maintenance of the project including power transmission lines.

The APP shall describe the protective measures that will be implemented to protect all avian species from adverse effects of power transmission line construction and operation.

(B) Drafts of the BEMP and the APP shall be provided to the USFWS for a 60-day review. The Applicant shall incorporate USFWS comments into the Final Plans within a 45-day period and file the Final BEMP and Final APP, along with documentation of USFWS consultation, with the Commission. The Applicant shall include a discussion of any comments and recommendations,

including a discussion of any measures not included in the Final BEMP and APP. The Applicant shall implement the Final BEMP and APP upon approval by the Commission.

Justification for § 10(j) Condition 7: Bald Eagle Management Plan and Avian Protection Plan

Activities associated with project operations, maintenance, construction or recreation may adversely affect, disturb and/or take bald eagles. Bald eagles are protected by federal law under the MBTA and BGEPA.

The development and implementation of a high quality, scientifically valid, and robust Bald Eagle Management Plan that is implemented in a timely and effective manner, and regularly reviewed and revised as needed, will maximize avoidance of take of bald eagles, while allowing for project construction, operations and maintenance activities in the most environmentally conscientious ways practicable.

The USFWS does not have information on file demonstrating that the Project is protective of bald eagles and golden eagles (*Aquila chrysaetos*). The Affected Area is likely to provide foraging habitat for eagles protected by the BGEPA (16 U.S.C. §§ 668-668c). The USFWS submits the following comments and attachments to the Commission to assist in permitting under the BGEPA. Our comments are consistent with USFWS responsibilities under the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. § 661 *et seq.*) and the Federal Power Act (FPA) (16 U.S.C. § 791a, *et seq.*).

The National Bald Eagle Management Guidelines (USFWS 2007, Attachment 4) are enclosed to provide you with background information in bald and golden eagle protection and to provide you with general management guidelines. During the licensing process, the Applicant should develop and implement an Avian Protection Plan (APP) that is designed to prevent bald and golden eagles from electrocution and line-strike. An APP is a utility-specific document that delineates a program designed to reduce the operational and avian risks that result from avian interactions with electric utility facilities.

The *Avian Protection Plan Guidelines* (APLIC and USFWS 2005, Attachment 5) should be followed in developing the APP. Although each utility's APP will be different, the overall goal of any APP should be to reduce avian mortality.

Transmission and distribution power lines should be designed and constructed following standards provided in the *Avian Protection Plan Guidelines* and in three associated documents: *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (APLIC 2006, Attachment 6); *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994* (APLIC 1994; Attachment 7), and *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (APLIC 2012; Attachment 8).

Adherence to these guidelines would help reduce the loss of wildlife habitat and prevent electrocution of perching birds, particularly hawks and eagles.

To our knowledge, no BGEPA coordination or permitting with the USFWS has occurred to address potential Project effects.

FPA § 10(j) Condition 8: California Red-Legged Frog Protection Plan

- (A) Within one year license of issuance, and after consultation with the USFWS, the Applicant shall file with the Commission a California red-legged frog protection plan (CRLFPP) for the conservation of California red-legged frogs. A draft of the CRLFPP shall be provided to the USFWS for a 60-day review. The Applicant shall incorporate USFWS comments into a Final CRLFPP within a 45-day period and file the Final CRLFPP, along with documentation of USFWS consultations with the Commission.
- (B) The Applicant shall prepare the watershed management and protection plan for the conservation of California red-legged frogs in collaboration with the USFWS to provide for and allow for California red-legged frogs in the Affected Area to become reestablished and to be protected from manageable threats.
- (C) The California red-legged frog protection plan shall include measures to control bullfrogs to prevent dispersal and assist with reestablishing California red-legged frog populations in the Affected Area.

Justification for § 10(j) Condition 8:

There are sites within the Affected Area that may provide suitable aquatic breeding habitat within dispersal distance of the California red-legged frog and its predator the bullfrog. O&M activities that may adversely affect the California red-legged frog would be best addressed through planning. Impoundments are known habitat for bullfrogs. Bullfrogs likely extirpated the California red-legged frog population in the Affected Area; however, bullfrogs are easily controlled and California red-legged frog populations have been shown to respond well to bullfrog control measures.

Both the USFWS and the Commission have an obligation to conserve the California red-legged frog in a manner consistent with ESA sections 2(b), 2(c), 3(“conserve”), 4(f)(2), 7(a)(1), and 7(a)(2).

This measure could be used to ensure that any potential negative impacts to California red-legged frogs as a result of Project O&M are either avoided or adequately mitigated.

SUMMARY

The USFWS does not support the issuance of an original license for the Project, because it would impact trust resources that the USFWS has gone to great effort to restore. The Project has the potential to negatively affect fish habitat in the proposed Project bypassed reach and negate the efforts that have been made to re-connect salmon to suitable habitat located in the proposed bypassed reach.

However, should the Applicant obtain a license for the Project it can be partially mitigated with a Section 18 prescription to prescribe fishways; with our proposed recommendations and conditions to protect, mitigate, and enhance fish and wildlife resources incorporated into the license; and with the Commission's compliance with its obligations under Section 7 of the ESA.

The impacts we seek to address through this submittal are somewhat addressed in our FPA recommended terms and conditions, which contains a wide variety of protection, mitigation and enhancement measures to benefit threatened and endangered species, water quality, and riparian, floodplain, and terrestrial and aquatic habitats throughout the Project. The USFWS's concerns regarding any ESA issues associated with the Project should be addressed through appropriate conservation measures and by the Commission through its compliance with Section 7 of the ESA, including development and implementation of appropriate conservation measures.

If the Commission's staff determines that any of the Section 10(j) fish and wildlife recommended conditions provided herein are inconsistent with the purposes and requirements of the FPA, as amended by the Electric Consumers Protection Act, then the Commission should notify the Field Supervisor, U.S. Fish and Wildlife Service, San Francisco Bay-Delta Fish and Wildlife Office, 650 Capitol Mall, Room 8-300, Sacramento, California 95814 to resolve the inconsistencies prior to issuance of the license.

Lastly, the USFWS recommends that the Commission initiate consultation discussions with the USFWS directly to jointly determine information needs to comply with Section 7 of the ESA on this licensing action.

REFERENCES

- Abbe, T.B., Brooks, A.P., Montgomery, D.R. 2003. Wood in river Rehabilitation and Management. In: Gregory, S.V., Boyer, K.L., Gurnell, A.M. (Eds.), American Fisheries Society, Bethesda, MD, pp. 367-389.
- Allen, J. D., M. S. Wipfli, J. P. Caouette, A. Prussian, and J. Rodgers. 2003. Influence of streamside vegetation on inputs of terrestrial invertebrates to salmonid food webs. Canadian Journal of Fisheries and Aquatic Sciences 60:309-320.
- Anderson, N. H., Swell, J. R., Roberts, L. M., and Tema, F. 1978. The role of aquatic invertebrates in processing of wood debris in coniferous forest streams. American Midland Naturalist 100:64-82
- Avian Power Line Interaction Committee and U. S Fish and Wildlife Service. 2005. Avian Protection Plan. 88pp.
http://www.aplic.org/uploads/files/2634/APPguidelines_final-draft_Aprl2005.pdf
- Avian Power Line Interaction Committee. 1994. Mitigating Bird Collisions with Power Lines: The State of the Art in 1994. 128pp.
<http://nmavianprotection.org/wp-content/uploads/2012/02/Mitigating-Bird-Collisions-wit>

[h-Power-Lines-The-State-of-the-art-1994.pdf](#)

- Avian Power Line Interaction Committee. 2006. Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute.
http://www.dodpif.org/downloads/APLIC_2006_SuggestedPractices.pdf
- Avian Power Line Interaction Committee. 2012. Reducing Avian Collisions with Power Lines: State of the Art in 2012. Edison Electric Institute. 184pp.
http://www.aplic.org/uploads/files/11218/Reducing_Avian_Collisions_2012watermarkLR.pdf
- Bisson, P. A., R. E. Bilby, M. D. Bryant, C. A. Dolloff, G. B. Grette, R. A. House, M. L. Murphy, K. V. Koski, and J. R. Sedell. 1987. Large woody debris in forested streams in the Pacific Northwest: past, present and future. Pages 143-190 in E.O. Salo and T.W. Cundy, editors. Streamside Management Forestry and Fishery Interactions. University of Washington Institute for Forest Resources, Contribution 57, Seattle, WA.
- Bottaro, R.J., L.A. Earley, and M.R. Brown. 2012. Monitoring adult Chinook salmon, rainbow trout, and steelhead in Battle Creek, California, from March through November 2010. USFWS Report. U.S. Fish and Wildlife Service, Red Bluff Fish and Wildlife Office, Red Bluff, California.
- Bryant, M.D.; Edwards, R.T.; Woodsmith, R.D. 2005. An approach to effectiveness monitoring of floodplain channel aquatic habitat: salmonid relationships. Landscape and Urban Planning. 72: 157–176.
- Bury, R.B. and J.A. Whelan. 1984. Ecology and management of the bullfrog. U.S. Fish and Wildlife Service Resource Publication 155. 23 pp.
catesbeiana Shaw at Freshwater Lagoon, Humboldt County, California. M.S. Thesis. Humboldt State University, Arcata. 53pp + appendix.
- Cederholm, C. J., D. H. Johnson, R. E. Bilby, L.G. Dominguez, A. M. Garrett, W. H. Graeber, E. L. Greda, M. D. Kunze, B.G. Marcot, J. F. Palmisano, R. W. Plotnikoff, W. G. Percy, C. A. Simenstad, and P. C. Trotter. 2000. Pacific Salmon and Wildlife - Ecological Contexts, Relationships, and Implications for Management. Special Edition Technical Report, Prepared for D. H. Johnson and T. A. O'Neil (Managing directors), Wildlife-Habitat Relationships in Oregon and Washington. Washington Department of Fish and Wildlife, Olympia, Washington.
- Cramer, S.P. and Ceder K. 2013. Stream flows and potential production of spring-run chinook salmon and steelhead in the upper South Fork of Battle Creek, California. Cramer Fish Sciences. Contract report to Tetra Tech, Bothell, WA.
- Cramer Fish Sciences (CFS). 2016. Personal communication: Electronic files of pressure-transducer and flow data collected in the bypassed reach by CFS.

- Crispin, V., R. House, and D. Roberts. 1993. Changes in instream habitat, large woody debris, and salmon habitat after the restructuring of a coastal Oregon stream. *North American Journal of Fisheries Management* 13:96-102.
- Cummins, K. W., M. A. Wilzbach, D. M. Gates, J. B. Perry, and W. B. Taliaferro. 1989. Shredders and riparian vegetation. *BioScience* 39(1):24-30.
- Cushman, R. M. 1985. Review of ecological effects of rapidly varying flows downstream from hydroelectric facilities. *North American Journal of Fisheries Management* 5(3A):330-339.
- Dolloff, C.A. 1983. The relationships of wood debris to juvenile salmonid production and microhabitat selection in small southeast Alaska streams. Bozeman, MT: Montana State University. 100 p. Ph.D dissertation.
- Emlen, S.T. 1977. "Double clutching" and its possible significance in the bullfrog. *Copeia* 1977(4):749-751.
- Finkle, J. A. 2012. Effects of the North American Bullfrog on Native California Amphibians: A study at Blue Oak Ranch Reserve and Joseph D. Grant County Park. *Bullfrogs in the Diablo Range Spring 2012*. 30pp.
- Fisher, R. N., and H. B. Schaffer. 1996. The decline of amphibians in California's Great Central Valley. *Conservation Biology* 10(5):1387-1397.
- Fisher, S. G., and A. Lavoy. 1972. Differences in littoral fauna due to fluctuating water levels below a hydroelectric dam. *Journal of the Fisheries Research Board of Canada* 29(10):1472-1476.
- Fuller, T. E., K. L. Pope, D. T. Ashton, and H. H. Welsh Jr. 2010. Linking the distribution of an invasive amphibian (*Rana catesbeiana*) to habitat conditions in a managed river system in Northern California. *Restoration Ecology* 2010:1-10.
- Harrington, J. M. 2003. *California Stream Bioassessment Procedures*. CDFG, Water Pollution Control Laboratory, Rancho Cordova, California.
- Hayes, S. A., M. H. Bond, C. V. Hanson, E. V. Freund, J. J. Smith, E. C. Anderson, A. J. Ammann, and R. B. MacFarlane. 2008. Steelhead growth in a small central California watershed: upstream and estuarine rearing patterns. *Transactions of the American Fisheries Society* 137:114-128.

- Jeffres, C. A., J. J. Opperman and P. B. Moyle. 2008. Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river. *Environmental Biology of Fishes* 83:449-458.
- Jennings, M.R. and M.P. Hayes. 1990. Final report of the status of the California red-legged frog (*Rana aurora draytonii*) in the Pescadero Marsh Natural Preserve. Contract 4-823-9018. California Department of Parks and Recreation, Sacramento, California.
- Kohler, C. C. and W. A. Hubert, Editors. 1999. *Inland Fisheries management in North America*, 2nd Edition. American Fisheries Society, Bethesda Maryland.
- Kohler, C.C. and W.A. Hubert, Editors. 1999. *Inland Fisheries Management in North America*, 2nd Edition. American Fisheries Society, Bethesda Maryland.
- Kondolf, G.M. 2000a. Some suggested guidelines for geomorphic aspects of anadromous salmonid habitat restoration proposals. *Restoration Ecology* 8: 48–56
- Kondolf, M. G. 2000b. Assessing salmonid spawning gravel quality. *Transactions of the American Fisheries Society*. 129: 262-281.
- Limm, M. P., and M. P. Marchetti. 2009. Juvenile Chinook salmon (*Oncorhynchus tshawytscha*) grown in off-channel and main-channel habitats on the Sacramento River Ca using otolith increment widths. *Environmental Biology of Fishes* 85:141-151.
- Merz, J. E. and J. D. Setka. 2004. Evaluation of a spawning habitat enhancement site for Chinook salmon in a regulated California river. *North American Journal of Fisheries Management*. 24:397-407.
- Merz, J.E. and P.B. Moyle. 2005. *Salmon, Wildlife, and Wine: Marine-Derived Nutrients in Human-Dominated Ecosystems of Central California*. Report provided to the East Bay Municipal Utility District, Lodi, California, and U.C. Davis, Davis, California.
- Moog, O. 1993. Quantification of daily peak hydropower effects on aquatic fauna and management to minimize environmental impacts. *Regulated Rivers: Research & Management* 8(1-2):5-14.
- Moyle, P. B. 1973. Effects of introduced bullfrogs, *Rana catesbeiana*, on the native frogs of the San Joaquin Valley, California. *Copeia* 1973(1):18-22.
- Naiman, R. J., R. E. Bilby, D. E. Schindler, and J. M. Helfield. 2002. Pacific salmon, nutrients, and the dynamics of freshwater and riparian ecosystems. *Ecosystems* 5: 399–417.
- National Marine Fisheries Service (NMFS). 2014a. *Final Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and Central Valley*

Spring-run Chinook Salmon and the Distinct Population Segment of California Central Valley Steelhead. NMFS, West Coast Region, Sacramento, CA. July 22, 2014.

National Marine Fisheries Service. 2007. Biological opinion on operation of Englebright and Daguerre Point Dams on the Yuba River, California.

Pozo, J., E. González, J. R. Díez, J. Molinero, and A. Elósegui. 1997. Inputs of particulate organic matter to streams with different riparian vegetation. *Journal of the American Benthological Society* 16(3):602-611.

Rehn, A. C., N. Ellenrieder, and P. R. Ode. 2007. *Assessment of Ecological Impacts of Hydropower Projects on Benthic Macroinvertebrate Assemblages: A Review of Existing Data Collected for FERC Relicensing Studies*. California Energy Commission, PIER Energy Related Environmental Research Program. CEC-500-2007-040.

Roni, P. and T.P. Quinn. 2001. Density and size of juvenile salmonids in response to placement of large woody debris in western Oregon and Washington streams. *Canadian Journal of Fisheries and Aquatic Sciences* 58: 282–292.

Sedell, J. R., G. H. Reeves, F. R. Hauer, J. A. Sanford, and C. P. Hawkins. 1990. Role of refugia in recovery from disturbances: modern fragmented and disconnected river systems. *Environmental Management* 14(5):711-724.

Sellheim, K and S.P. Cramer. 2013. Lassen Lodge Hydropower Project: salmonid habitat assessment for upper South Fork Battle Creek, Cramer Fish Sciences. Contract report submitted to Tetra Tech, Bothell, WA.

Shirvell, C. S. 1994. Effect of changes in streamflow on the microhabitat use and movements of sympatric juvenile coho salmon *Oncorhynchus kisutch* and chinook salmon *O. tshawytscha* in a natural stream. *Canadian Journal of Fisheries and Aquatic Sciences* 51: 1644–1652.

Short, R. A., and P. E. Maslin. 1977. Processing of stream litter by a detritivore: effect on nutrient availability to collectors. *Ecology* 58:935-938.

Sommer, T. R., W. C. Harrel, A. M. Solger, B. Tom, and W. J. Kimmerer. 2004. Effects of flow variation on channel and floodplain biota and habitats of the Sacramento River, California, USA. *Aquatic Conservation Marine and Freshwater Ecosystems* 14:246-261.

Storer, T.I. 1925. A synopsis of the amphibia of California. University of California. *Publications in Zoology* 27:1-342

Tetra Tech. 2014. Noxious Weed Management and Revegetation Plan. Lassen Lodge Hydroelectric Project. Tetra Tech, Bothell, WA,

- Tetra Tech. 2015. Appendix H, Threatened, Endangered, and Sensitive Wildlife Species Habitat Assessment. Lassen Lodge Hydroelectric Project. Tetra Tech, Bothell, WA,
- Twedt, B. 1993. A comparative ecology of *Rana aurora* Baird and Girard and *Rana catesbeiana* Shaw at Freshwater Lagoon, Humboldt County, California. M.A. Thesis. Humboldt State University.
- U.S. Environmental Protection Agency. 2003. EPA Region 10 Guidance for Pacific northwest state and tribal temperature water quality standards. EPA 910-B-03-002. Washington, D.C.: Office of Water Regulations and Standards Criteria and Standards Division, USEPA. 49 p.
- USFWS. 1996. Endangered and threatened wildlife and plants; determination of threatened status for the California red-legged frog. Federal Register 61(101):25813- 25833.
- USFWS. 2002. Recovery Plan for the California Red-Legged Frog (*Rana aurora draytonii*). USFWS, Sacramento, California.
- USFWS. 2004. Endangered and threatened wildlife and plants; proposed designation of critical habitat for the California red-legged frog. Proposed Rule Federal Register 69(71):19620- 19642.
- USFWS. 2005. Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog. U.S. Fish and Wildlife Service, Sacramento, CA.
- USFWS. 2007. National Bald Eagle Management Guidelines. U.S. Fish and Wildlife Service, Washington DC. 23 pp
- Ward, J. V., and J. A. Stanford. 1995. Ecological connectivity in alluvial river ecosystems and its disruption by flow regulation. Regulate Rivers: Research & Management 11(1):105-119.
- Weiland, M. A., and R. S. Hayward. 1997. Cause for the Decline of Large Rainbow Trout in a Tailwater Fishery: Too Much Putting or Too Much Taking? Transactions of the American Fisheries Society 126(5):758-773.
- Weisberg, S. B., A. J. Janicki, J. Gerritsen and H. T. Wilson. 1990. Enhancement of benthic macroinvertebrates by minimum flow from a hydroelectric dam. Regulated Rivers: Research & Management 5(3):265-277.
- Wipfli, M. S., and C. V. Baxter. 2010. Linking ecosystems, food webs, and fish production: Subsidies in salmonid watersheds. Fisheries 35(8):373-387.

Thank you for the opportunity to review this project.

Sincerely,

A handwritten signature in black ink that reads "Patricia Sanderson Port". The signature is written in a cursive style with a large, looping initial "P" at the end.

Patricia Sanderson Port
Regional Environmental Officer

Cc:

OEPC-Staff Contact: Shawn Alam, 202-208-5465; shawn_alam@ios.doi.gov

RSOL-Staff Contact: Kerry O'Hara, 916-978-5670; kerry.o'hara@sol.doi.gov

FWS- Staff Contact: John Henderson, 916-414-6595; john_henderson@fws.gov

BOR-Supervisory Natural Resource Specialist, Paul Zedonis; 530-276-2047; pzedonis@usbr.gov

BOR-Environmental Project Manager, Mary Marshall; 916-978-5248; mmarshall@usbr.gov

BOR-FERC Coordinator, Paul Landry, 916-979-0255; plandry@usbr.gov

ATTACHMENTS

Attachment 1: Effects of the North American Bullfrog on Native California Amphibians: A Study at Blue Oak Ranch Reserve and Joseph D. Grant County Park

Attachment 2: Linking the Distribution of an Invasive Amphibian (*Rana catesbeiana*) to Habitat Conditions in a Managed River System in Northern California

Attachment 3: Lassen Lodge PHABSIM

Attachment 4: U.S. Fish and Wildlife Service National Bald Eagle Management Guidelines

Attachment 5: Avian Protection Plan (APP) Guidelines, A Joint Document Prepared by The Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) and U.S. Fish and Wildlife Service

Attachment 6: Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006

Attachment 7: Mitigating Bird Collisions With Power Lines: The State of the Art in 1994

Attachment 8: Reducing Avian Collisions with Power Lines: The State of the Art in 2012